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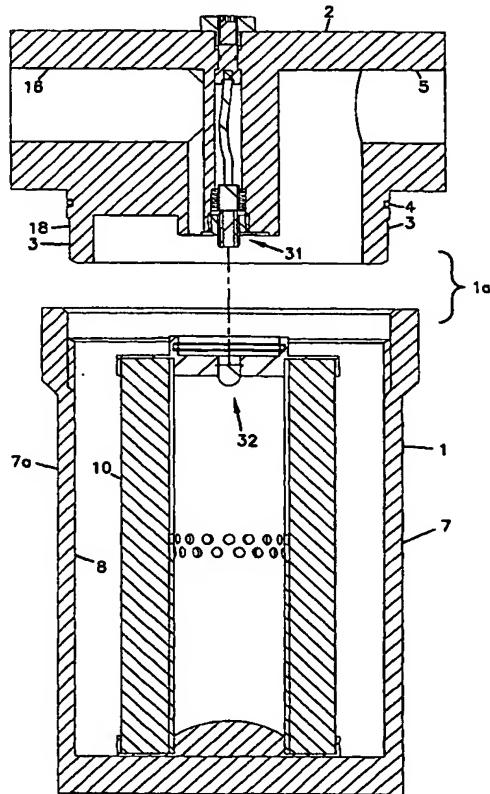
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(54) Title: FILTER CARTRIDGE HAVING COMPONENT FOR USE WITH A SENSOR SYSTEM; ASSEMBLIES; AND, METHODS



(57) Abstract: According to the present disclosure a filter cartridge used as a serviceable component in a cartridge-style filter assembly is provided. The filter cartridge includes, mounted thereon, a communication/sensor circuit completion unit operably positioned so that it will complete a signal circuit only when the filter cartridge is properly mounted, for use. In a typical application, the communication/sensor circuit completion unit is an optic circuit completion unit. The communication /sensor circuit completion unit can be configured: as an optic conduit or reflector, which merely indicates that a circuit is complete; or it can be configured as part of an analytical sensor to evaluate a condition of liquid that passes outwardly from the filter cartridge. A cartridge-style filter assembly including a filter cartridge as characterized, is also provided. Further, a filter assembly comprising a filter head with a cartridge-style filter assembly as characterized is provided. Further, a filter head configured for use with such a serviceable filter cartridge, is provided. Finally, methods of assembly and use are described.

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# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B01D27/10 B01D35/14

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 051 144 A (MCPHERSON W ROGER ET AL) 18 April 2000 (2000-04-18)	1-7, 11-16, 18-21
Y	abstract; figures 1-35 column 4, line 3 - line 53 column 21, line 3 - line 23 ---	10,17
X	WO 94/22551 A (DOCTRO A V V ;DEKKER D J M DEN (NL)) 13 October 1994 (1994-10-13)  page 1, line 1 - line 20 page 2, line 34 -page 3, line 20; figure 1 ---	1-3,11, 12,14, 15,21
X	WO 01/30483 A (FESTO AG & CO ;FRANZ JOCHEN (DE); GEBAUER GUENTER (DE)) 3 May 2001 (2001-05-03)  page 1, line 11 - line 19 page 17, line 1 - line 21; figures 1-6 ---	1,3,6, 11-15,21
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94/20784 A (MCKAY JAMES ANTHONY ;MCKAY LYNTON JOHN (AU); SHERINGHAM INVESTMENT) 15 September 1994 (1994-09-15) page 6, line 12 -page 7, line 4; figures 1-5 -----	1,2,6, 11,14
X	US 5 378 254 A (MALY EDWARD C ET AL) 3 January 1995 (1995-01-03)	1,11
Y	abstract; figure 6 -----	10
X	US 4 721 563 A (ROSAEN BORJE O) 26 January 1988 (1988-01-26)	1,2,6, 11,14
Y	column 4, line 57 -column 5, line 7; figures 1-9 -----	17

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/US 03/35394

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 6051144	A	18-04-2000	US CA	5876610 A 2229700 A1		02-03-1999 19-09-1998
WO 9422551	A	13-10-1994	NL AU DE DE DK EP FI JP JP WO NO US	9300554 A 6544994 A 69401006 D1 69401006 T2 700313 T3 0700313 A1 954493 A 3501805 B2 9500816 T 9422551 A1 953825 A 5674381 A		17-10-1994 24-10-1994 09-01-1997 22-05-1997 14-04-1997 13-03-1996 22-09-1995 02-03-2004 28-01-1997 13-10-1994 27-09-1995 07-10-1997
WO 0130483	A	03-05-2001	DE WO EP HU JP US	19951961 A1 0130483 A1 1144082 A1 0104583 A2 2003512166 T 6645277 B1		03-05-2001 03-05-2001 17-10-2001 28-03-2002 02-04-2003 11-11-2003
WO 9420784	A	15-09-1994	AU WO	6255094 A 9420784 A1		26-09-1994 15-09-1994
US 5378254	A	03-01-1995	NONE			
US 4721563	A	26-01-1988	NONE			